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SPECIFICATION <EXCERPT>

[0002]

[Prior Art]

VTRs and recording and playback devices using exchangeable media such as relatively low-speed optical disks are currently widely used due to the low cost of the media. Furthermore, recording and playback equipment using high-speed recording and playback media such as hard disks, high-speed optical disks or solid-state memories enable the recording of moving image data in the same media at the same time as playback and display of different moving image data. In this manner, it is possible to enjoy TV programs from the start at an arbitrary time irrespective of the time of TV broadcast.

[0003]

[Problem to be solved by the Invention]

However due to the high cost of this type of high-speed recording and playback media, there is the problem that it is not suitable for long-time recording.

[0004]

Conversely, recording and playback devices using low-cost exchangeable media entail the following problems.

[0005]

1. It is not possible to playback data recorded at another time at the same time as recording.

[0006]

2. It is not possible to record data inputted while exchanging media.

[0007]

3. It is difficult to insert data other than input data or to

delete a part of data inputted during recording.

[0008]

4. It is difficult to delete a part of data or to playback other than in the recorded sequence during playback.

[0009]

5. Since it is difficult to invalidate data recorded during playback, transfer of data which cannot be copied to other media is difficult.

[0010]

It is an object of the present invention to solve the above problems in the above type of conventional recording and playback device.

[0011]

[Means of Solving the Problem]

In order to achieve the above object, a first aspect of invention (corresponding to claim 1) is a data recording and playback device that performs at least playback of copy protected data. The data playback device is provided with a data conversion unit converting the state of the copy protected data. When the data conversion unit performs playback of copy protected data, in parallel with the playback operation, each section of the recorded copy protected data which has already been played is placed into a non-playback state.

[0012]

A second aspect of the present invention (corresponding to claim 2) is a data recording device in which a data recording and playback device are provided with a data playback unit performing at least playback of copy protected data and a data recording unit performing at least recording of copy protected data. The data playback unit has a first data conversion unit for deleting or placed into a non-playback state the copy protected data. The data recording unit has a second data conversion unit recording and

placing the copy protected data into a non-playback state upon the input of copy protected data. When the data recording unit confirms the completion of recording of copy protected data, the first data conversion unit deletes or places into a non-playback state the copy protected data recorded in the data recording unit which is retained in the data playback unit.

[0013]

A third aspect of the present invention (corresponding to claim 3) is the data recording device in which the second data conversion unit places the recorded copy protected data into a playback state when the data recording unit confirms the completion of deletion of copy protected data.

[0014]

A fourth aspect of the present invention (corresponding to claim 4) is a data recording and playback device in which the operation of the data conversion unit or the first data conversion unit and the second data conversion unit is realized at least by an operation uncontrollable by the user performing recording and playback of the copy protected data.

[0015]

A fifth aspect of the present invention (corresponding to claim 5) is a data recording and playback device provided with a data recording and playback unit enabling simultaneous playback and recording of data and a second data recording unit having an exchangeable recording medium and enabling recording of data onto the recording medium. The data recording and playback unit and the second data recording unit use the same data as an object for recording. The data recording and playback unit records the same data contents as recorded by the second data recording unit and at the same time playbacks the same data contents.

[0016]

A sixth aspect of the present invention (corresponding to

claim 6) is a data recording and playback device provided with a data recording and playback unit enabling simultaneous playback and recording of data and a second data recording unit having an exchangeable recording medium and enabling recording of data onto the recording medium. The second data recording unit records data played back by the data recording and playback unit.

[0017]

A seventh aspect of the present invention (corresponding to claim 7) is a data recording and playback device provided with a data recording and playback unit enabling simultaneous playback and recording of data and a second data recording unit having an exchangeable recording medium and enabling recording of data onto the recording medium. The data recording and playback unit and the second data recording unit use the same data as an object for recording. The data recording and playback unit records data as supplementary data while the recording medium is not stored in the second data and playback unit, and when the recording medium is stored, after recording the supplementary data, the second data recording unit performs recording of the same data as that recorded by the data recording and playback unit.

[0018]

A eighth aspect of the present invention (corresponding to claim 8) is a data recording and playback device provided with a data recording and playback unit enabling simultaneous playback and recording of data and a second data recording unit having an exchangeable recording medium and enabling recording of data onto the recording medium. The data recording and playback unit and at least one of the second data recording unit use the same image recording signal as an object for recording. The data recording and playback unit records data as supplementary data while the recording operation of at least one of the second data recording unit is stopped, and a second data recording unit other

than the above second data recording unit records the same data as the data recorded by the data recording and playback unit after recording the supplementary data.

[0019]

A ninth aspect of the present invention (corresponding to claim 9) is a data recording and playback device provided with a data recording and playback unit enabling simultaneous playback and recording of data and a second data recording unit having an exchangeable recording medium and enabling recording of data onto the recording medium. The data recording and playback unit records data played back by the second data recording unit and plays back and varies the playback order of the data.

[0020]

A tenth aspect of the present invention (corresponding to claim 10) is a data recording and playback device in which the operation between the data recording and playback unit and the second data recording unit is realized by an operation uncontrollable by the user performing recording and playback of the data.

[0021]

An eleventh aspect of the present invention (corresponding to claim 11) is a data recording and playback device provided with a data playback unit, data recording unit or a first recording and playback unit using a random access recording medium.

[0022]

A twelfth aspect of the present invention (corresponding to claim 12) is a data recording and playback device in which the data playback unit or the second data recording unit uses a random access recording medium.

[0023]

A thirteenth aspect of the present invention (corresponding to claim 13) is a data recording and playback device provided with a data playback unit and a data recording unit or a first recording and

playback unit and a second recording and playback unit which form an apparatus enabling individual operation and connected through respective networks and realizing as a system performing data transfer through the networks.

[0024]

A fourteenth aspect of the present invention (corresponding to claim 14) is a data recording and playback device in which the data is AV (audiovisual) data.

[0025]

A fifteenth aspect of the present invention (corresponding to claim 15) is a medium retaining programs and/or data for the execution by a computer of all or a part of the functions of all or a part of the unit of the present invention.

[0026]

A first aspect of the present invention (corresponding to claim 16) is an information compilation wherein programs and/or data are provided for the execution by a computer of the all or a part of the functions of all or a part of the unit of the present invention.

[0027]

[Preferred Embodiments]

The embodiments of the present invention will be described hereafter making reference to the figures.

[0028]

[First Embodiment]

FIG. 1 is a block diagram of a first embodiment of a recording and playback device according to the present invention. Reference numeral 1501 in FIG. 1 denotes an HDD playback unit and 1502 denotes a VTR recording unit. In the HDD playback unit 1501, 501 denotes a recording unit using a hard disk as a recording medium, and 502 denotes a data conversion unit. The VTR recording unit 1502 is a unit using magnetic tape as a recording medium.

[0029]

The operation of the embodiment of the present invention having the above structure will be described hereafter. In this embodiment, data (copy protected data) which is prevented from copying and is recorded in the recording unit 501 of the HDD playback unit 1501 is outputted to the VTR recording unit 1502. The data conversion unit 502 in the HDD playback unit 1501 at this time monitors the data outputted from the recording unit 501 and invalidates respective data portions outputted from recording regions of the recording unit 501 to prevent playback from the hard disk.

[0030]

An example of data invalidation is described hereafter. In other words, data in the HDD playback unit 1501 is maintained by file. These files are constituted by data which is the entity data of the file and file administrative information for managing information such as the file name. When the file administrative information does not disclose information such as the file name or the like to a user, it is possible to invalidate the data by performing a setting in which entity data is not disclosed to a user.

[0031]

Encryption of data or files in the HDD playback unit 1501 for each playback file or read data may also be performed to prevent reading by a user.

[0032]

The VTR recording unit 1502 performs sequential recording of input copy protected data.

[0033]

When recording is not possible due to a malfunction of the VTR recording unit 1502 or insufficient recording capacity, the data conversion unit 502 revalidates data invalidated by the HDD playback unit 1501 and returns such data to an original state.

[0034]

In the stage in which the HDD playback unit 1501 outputs all data to the VTR recording unit 1502 and the VTR recording unit 1502 has recorded all data outputted by the HDD playback unit 1501, data retained by the HDD playback unit 1501 is invalidated so that all data cannot be played back.

[0035]

Normally when using media such as magnetic tape which entails difficulties with respect to simultaneous playback and deletion, when transferring the data to another medium, the original data exists both on the playback and recording sides. As a result, application has not been possible to the transfer of copy protected data.

[0036]

With respect to the above point, this embodiment has a characteristic in which the hard disk performs instantaneous control the validation and invalidation of arbitrary data in a recording region. Therefore data already outputted onto the hard disk can be invalidated by the data conversion unit 502 at the same time as it is outputted from the HDD playback unit 1501. Data validation means that the data is in a playable state and data invalidation means that although the data is stored, it is not in a playable state.

[0037]

Therefore in the above manner, even copy protected data can be transferred to a VTR. Furthermore even when the VTR recording unit 1502 could not normally record the data, it is possible to return the data to an original state.

[0046]

[Third Embodiment]

FIG. 3 is a block diagram of a third embodiment of a recording and playback device according to the present invention. Reference numeral 1101 in FIG. 1 denotes a data input unit, 1102 denotes an

HDD recording and playback unit, 1103 denotes a VTR recording unit, and 1104 denotes a playback and display unit.

[0047]

The operation of the embodiment of the present invention having the above structure will be described hereafter. In this embodiment, a TV signal transmitted from a broadcast station is inputted and converted to digital AV data by a data input unit 1101. The converted AV data is inputted into an HDD recording and playback unit 1102 and a VTR recording unit 1103. At the same time, the HDD recording and playback unit 1102 records the AV data inputted to a recording and playback hard disk at an arbitrary position.

[0048]

The VTR recording unit 1103 records AV data inputted to a tape on which playback of other data during recording processes is difficult. The HDD recording and playback unit 1102 plays back arbitrary data already-recorded in accordance with a user specification and displays the data on the playback and display unit 1104.

[0049]

Since the media cost of VTR per hour is normally extremely low, it is very commonly used to record a plurality of TV programs. However there is the problem that once recording has commenced, it is not possible to play back that program from the beginning until the end of recording a program is reached.

[0050]

In contrast, since a hard disk can perform high-speed simultaneous recording and playback, the program can be played back from the beginning while recording the program. However since the cost of hard-disk media is extremely high, recording a plurality of programs is difficult.

[0051]

Consequently, this embodiment is adapted so that the same AV data can be recorded at the same time on a VTR and hard disk. In this way, a program can be played back from an arbitrary position on a hard disk during recording of the program.

[0052]

Since the entire program is recorded on the VTR at the completion of the program, the data in the hard disk can be deleted and used for the next program recording. As a result, hard disks which have high associated media costs can be realized with a relatively small capacity to reduce the total cost.

[0053]

[Fourth Embodiment]

FIG. 4 is a block diagram of a fourth embodiment of a recording and playback device according to the present invention. Reference numeral 1101 in FIG. 4 denotes a data input unit, 1202 denotes an HDD recording and playback unit, 1103 denotes a VTR recording unit, and 1104 denotes a playback and display unit.

[0054]

The operation of the embodiment of the present invention having the above structure will be described hereafter. In this embodiment, a TV signal transmitted from a broadcast station is inputted into the HDD recording and playback unit 1202 through the data input unit 1101. The inputted data is recorded onto a hard disk in the HDD recording and playback unit 1202. The recorded data is read in an arbitrary sequence in accordance with a user's specification and recorded onto the VTR recording unit 1103. The data inputted into the VTR recording unit 1103 is displayed on the playback and display unit 1104.

[0055]

In the fourth embodiment, since input data is recorded onto the hard disk and then rearranged for recording onto the VTR, scenes which a user does not want to record such as commercials

can be deleted during recording onto the VTR. Furthermore favorite scenes already on the hard disk can be compiled and recorded onto a single tape.

[0056]

[Fifth Embodiment]

FIG. 5 is a block diagram of a fifth embodiment of a recording and playback device according to the present invention. Reference numeral 1101 in FIG. 5 denotes a data input unit, 1302 denotes an HDD recording and playback unit, and 1303 denotes a VTR recording unit.

[0057]

The operation of the embodiment of the present invention having the above structure will be described hereafter. In this embodiment, a TV signal transmitted from a broadcast station is inputted into the HDD recording and playback unit 1302 and the VTR recording unit 1303 through the data input unit 1101.

[0058]

In the VTR recording unit 1303, input data from the data input unit 1101 is normally recorded. However when the tape is exchanged, recording is temporarily stopped and after exchanging the tape, playback output from the HDD recording and playback unit 1302 is recorded.

[0059]

The HDD recording and playback unit 1302 records the input data onto the hard disk and the recorded data is inputted to the VTR recording unit 1303 by playing back after delaying by only the time taken for exchanging the tape in the VTR recording unit 1303.

[0060]

In the fifth embodiment, when the VTR tape is exchanged, the data which should originally be inputted into the VTR is temporarily recorded onto the hard disk and outputted again to the VTR and recorded. Thus recording using a plurality of tapes is possible

without breaks in continuous input.

[0061]

Although the present embodiment has been described with respect to recording on the basis of the VTR recording unit 1303 rearranging and recording an input from data input unit 1101 and an input from the HDD recording and playback unit 1302, it is possible to also realize an arrangement in which inputs from the HDD recording and playback unit 1302 are constantly recorded in the same manner as the fourth embodiment. Furthermore this embodiment enables realization of an arrangement in which not one but a plurality of VTR recording units (recording devices) are connected to the HDD recording and playback unit. In this case, there is no necessity to exchange tape in the same VTR recording unit and when the recording capacity of the tape in a single VTR recording unit is expired, the playback output from the HDD recording and playback unit can be inputted to another VTR recording unit for recording.

[0062]

[Sixth Embodiment]

FIG. 6 is a block diagram of a sixth embodiment of a recording and playback device according to the present invention. Reference numeral 1401 in FIG. 6 denotes a VTR playback unit, 1402 denotes an HDD recording and playback unit, and 1104 denotes a playback and display unit.

[0063]

The operation of the embodiment of the present invention having the above structure will be described hereafter. In this embodiment, playback data from the VTR playback unit 1401 is firstly recorded in the HDD recording and playback unit 1402. The recorded data is read in an arbitrary sequence in the HDD recording and playback unit 1402 in accordance with a user's specification and displayed on the playback and display unit 1104.

[0064]

In the sixth embodiment, since playback data from the VTR is recorded temporarily onto the hard disk and then rearranged for display, scenes not wanted for recording such as commercials can be deleted from the display. Furthermore favorite scenes of a user already recorded on the hard disk can be mixed and displayed on the playback and display unit 104.

[0065]

Although the invention has been described with reference to several embodiments above, it is possible to use software processing or the like to automatically execute the processing of the embodiments without awareness of the presence of a hard disk by a user merely specifying recording or playback processing to the VTR. For example, in the network according to the third embodiment as shown in FIG. 3, a personal computer is connected which mounts software for controlling the HDD recording and playback unit 1102 and the VTR recording unit 1103. When a user uses the control software mounted in the personal computer and outputs a recording command to the VTR recording unit 1103, the personal computer without notifying the user transmits a recording command to the HDD recording and playback unit 1102 and records in HDD recording and playback unit 1102 data which is the same as that recorded by the VTR recording unit 1103.

[0066]

On the other hand, when a user uses the personal computer to output a playback command to the VTR recording unit 1103, the personal computer uses the reading position of the playback data to determine whether to playback data in the VTR recording unit 1103 or to playback data in the HDD recording and playback unit 1102 and then performs playback.

[0067]

In the above operation, although the user transmits the

command with respect to the VTR recording unit 1103, the user is not notified of the control process.

[0068]

Although the above operation is performed under control via a personal computer connected as an attachment to the example shown in FIG. 3, the operation may be realized by use of a simpler device (an AV remote control) than a personal computer, or may be realized by a control unit 1105 mounted in the VTR recording unit 1103 shown in FIG. 3 or may be realized by the control unit 1105 communicating with the HDD recording and playback unit 1102 in response to a command from a user to make virtual use of an HDD recording and control unit as a means for the VTR recording unit. Furthermore, the control unit 1105 may be stored in the HDD recording and playback unit 1103.

[0069]

In this case, the entire recording and playback device can be used as a random access VTR and therefore provides a user with the high-level functions above with extremely simple operations.

[0070]

Since the user is not aware that data is present in the hard disk at this time, there is the possibility that automatic overwriting may occur on a subsequent occasion. Consequently there is a high practical value for cheap low-capacity hard disks for temporary recording.

[0071]

The data playback device according to the first aspect of the present invention corresponds to the HDD playback unit 1501 according to the first embodiment. The data playback device according to the second aspect of the present invention corresponds to the VTR playback unit 1601 according to the second embodiment. The data recording unit according to the second aspect of the present invention corresponds to the HDD recording unit 1602

according to the second embodiment. The data recording and playback device according to the fifth aspect of the present invention corresponds to the HDD playback unit 1102 according to the third embodiment. The data recording and playback device according to the sixth aspect of the present invention corresponds to the HDD playback unit 1202 according to the fourth embodiment.

[0072]

The data recording and playback unit according to the seventh aspect of the present invention corresponds to the HDD recording and playback unit 1302 according to the fifth embodiment. The data recording and playback unit according to the ninth aspect of the present invention corresponds to the HDD recording and playback unit 1402 according to the sixth embodiment.

[0073]

The second data recording unit according to the fifth aspect of the present invention corresponds to the VTR recording unit 1302 according to the third embodiment. The second data recording unit according to the sixth aspect of the present invention corresponds to the VTR recording unit 1203 according to the fourth embodiment. The second data recording unit according to the seventh aspect of the present invention corresponds to the HDD recording unit 1303 according to the fifth embodiment. The second data recording unit according to the ninth aspect of the present invention corresponds to the VTR recording and playback unit 1401 according to the sixth embodiment.

[0074]

However in addition to hard disks such as the HDD recording and playback unit in each of the above embodiments, the data playback device, data playback unit, data recording unit and data recording and playback unit according to the present invention can be realized by use of various recording devices including relatively high-speed optical disks or RAMs. Furthermore in addition to VTR

such as the VTR recording unit in each of the above embodiments, the data playback unit and the second data recording unit of the present invention can be realized by use of various recording unit such as including relatively high-speed optical disks or magnetic tapes. Devices may be used which have a higher memory capacity than the hard disks used in the HDD recording and playback unit in each of the above embodiments. Furthermore input data can be adapted to sources other than TV signals.

[0075]

The recording unit, playback unit and recording and playback unit used in each of the above embodiments may be provided as single devices or may be connected in a network. In this case, use of only software is possible for controlling the above operations by connection of a computer to the network.

[0076]

Each of the above embodiments can be used in an arbitrary combination.

[0077]

In the above description, the data playback device or the data recording and playback device in the embodiments of the present invention were described. However the present invention is a medium which retains programs and/or data for the execution by a computer of the all or a part of the functions of all or a part of the unit of the present invention. The invention may be realized as a medium in which programs and/or data which are computer readable or have been read execute the functions in cooperation with a computer.

[0078]

The present invention is programs and/or data for the execution by a computer of the all or a part of the functions of all or a part of the unit of the present invention and may be realized as an information compilation characterized in executing those functions

in cooperation with a computer.

[0079]

Furthermore in the above, data include data structure, data format, and data types. Media include recording media such as ROMs, transmission media such as the Internet, and transmission media such as light, electrical waves or sound waves. Retained media include for example recording media recording programs and/or data or transmission media transmitting programs and/or media.

[0080]

Capable of processing by a computer unit, for example with respect to recording media such as ROMs, readable by a computer and with respect to transmission media, that it can handled by a computer as a result of transmission of the program and/or data being the subject of transmission. An information compilation for example includes software such as programs and/or data.

[0081]

Thus as described above, the structure of the present invention may be realized by software or by hardware.

[0082]

[Effect of the Invention]

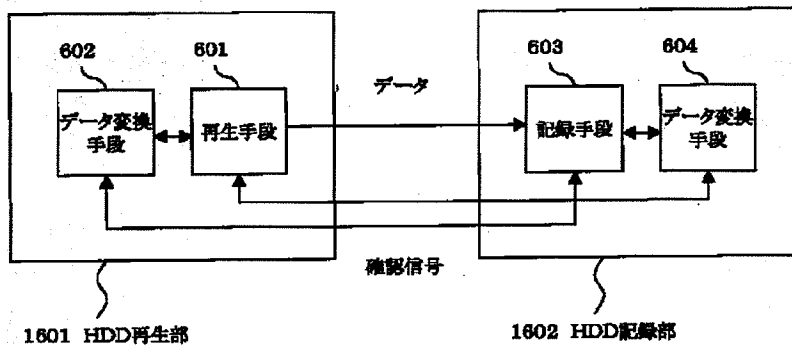
The above structure of the present invention enables transfer of copy protected data to another media even when using media which entail difficulties with respect to the simultaneous execution of deletion and playback such as VTR.

[0083]

Another invention enables the transfer of copy protected data from another media to media which entail difficulties with respect to the simultaneous execution of deletion and playback such as VTR

DRAWINGS

FIG. 2



1601: HDD Playback Unit

1602: HDD Recording Unit

601: Playback Unit

602: Data Conversion Unit

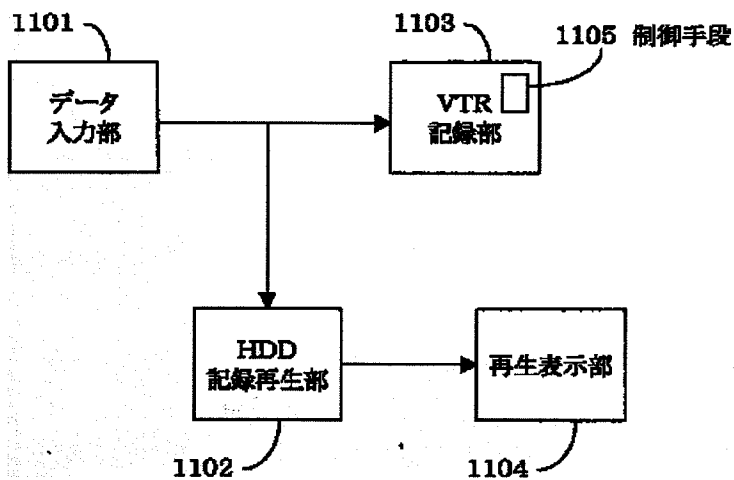
603: Recording Unit

604: Data Conversion Unit

確認信号 Confirmation Signal

データ Data

FIG. 3



1101: Data Input Unit

1102: HDD Recording and Playback Unit

1103: VTR Recording Unit

1104: Playback and Display Unit

1105: Control Unit